BACTERIOLOGY-PHYSICS

Intense High-Pitched Sound Used to Kill Milk Bacteria

"Singing" Tube Placed in Liquid Produces Sonic Waves That Destroy Eighty Per Cent. or More of Organisms

MILK and similar liquids may some day be sterilized by subjection to a "terrific squeak" instead of by heat treatment. This possibility is visioned as a result of experiments by Dr. Leslie A. Chambers and Prof. Newton Gaines of Texas Christian University. The apparatus which they have constructed and used in their laboratories averaged a kill of 80 per cent. of all bacteria present in various samples of milk, and in a few samples it produced complete sterilization.

The new apparatus was evolved from an earlier form used by Prof. Gaines and Prof. O. B. Williams of the University of Texas last year. Basically it involves the same device: a nickel tube caused to vibrate intensely and at a high rate by being placed in a rapidly alternating magnetic field controlled by mechanism similar to that used in radio broadcasting. This causes the tube to "sing" with an exceedingly high-pitched audible note. Partially immersed in water or other liquid, its intense sound waves are very destructive to bacteria and other small organisms.

In the apparatus used last year, the experimenters killed bacteria in a flask. This year's endeavor was to develop a means of sterilizing or partially sterilizing liquids as they flowed past and around the tube, making the process continuous instead of intermittent. This was accomplished by inserting the upper half of the nickel tube into a larger tube of glass, making the joint by means of a water-tight rubber collar. The lower end of the tube was given the magnetic impulses, and the upper end drove its high-frequency sound waves into the milk as it flowed through the space between the two tubes, and especially as it flowed through a narrow funnel-shaped outlet.

The laboratory model was of sufficient size to allow continuous treatment of milk at the rate of 100 quarts an hour, but the nature of the apparatus is such that the capacity may be expanded almost without limit, the experimenters state.

With the cooperation of a commercial milk concern, the apparatus was tested on a large number of samples of Grade A milk, with initial bacterial counts varying from 8,000 to 30,000 per cubic centimeter. A few samples of pasteurized milk showing 3,000 to 5,000 counts were also tested, with results indicating that the vibration treatment destroys germs not affected by pasteurization temperatures.

Other liquids that may eventually be treated by the new method include certain dietary products and delicate sera for use in medicine—in general, products that require a radical reduction in germ count, if possible, without heating.

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OCEANOGRAPHY

Submarine Cruise Yields Data on Earthquakes

THE U. S. Submarine S-48, carrying a staff of scientists and apparatus designed for measuring the force of gravity under water, has arrived at Miami, ending a cruise among the West Indies begun on Feb. 7. The leaders of the expedition are Dr. Richard M. Field of Princeton University and Dr. F. A. Vening Meinesz of the University of Utrecht and the Netherlands Geodetic Commission.

"This is the first time we were able to obtain real data which has a bearing on earthquakes," Dr. Field stated. "Dr. Meinesz has developed a specially constructed pendulum to determine gravitation. Once this was determined we were able to speculate as to the character of rock formations, columns of rocks of different kinds having certain gravity. With this certain gravity we can tell what kind of rock should be there and knowing that determine the topography of the sea floor and how it was produced.

"It will be three months before the field data and preliminary calculations which we have made are computed. From the isostatic reduction of these we can find if certain blocks are in or out of balance and whether they should go up or down."

With Dr. Meinesz' apparatus in the submarine, 55 dives were made to approximately 70 feet under the surface. Soundings were made every fifteen minutes coincidentally with the gravitation tests.

Four dives were made between Nassau and Miami. Fifty-one dives were made in 33 days from Feb. 7. The cruise made a total of 4,000 miles in three loops. The first was southward of Jamaica and around the west end of Cuba. The second around the Caicos bank through Caicos and Turks Island passage. The third was from Guantanamo through the Bahamas to Nassau and Miami.

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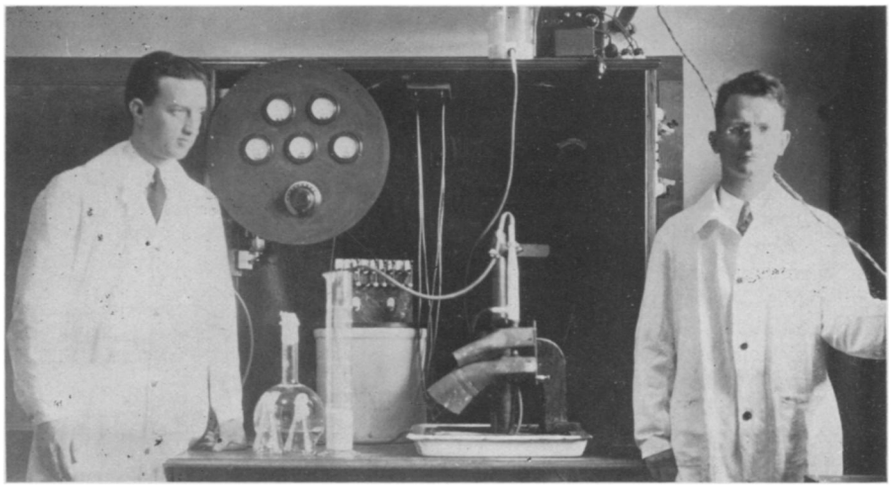

KILLING BACTERIA WITH HIGH-PITCHED SOUND WAVES

This new apparatus developed by Dr. Leslie A. Chambers, left, and Prof. Newton Gaines of Texas Christian University will in its present form kill 80 per cent. or more of all organisms in milk flowing through it at a rate of 100 quarts an hour.